ANALYSIS OF VALIDITY OF EMISSION REDUCTIONS AS ERC

AIR PERMITS DIVISION
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

DONALDSONVILLE PLANT
TERRA MISSISSIPPI NITROGEN, INC
DONALDSONVILLE, ASCENSION PARISH, LOUISIANA
AI NO. 2245, ACTIVITY NO. 20050012

Background

Terra Mississippi Nitrogen, Inc. (Terra), a wholly owned subsidiary of Terra Industries, owns and operates an anhydrous ammonia plant located at 39139 Highway 18 West, Donaldsonville, in Ascension Parish, Louisiana. Previously, the site was owned and operated as two facilities: 1) a melamine plant owned by Melamine Chemicals, a subsidiary of Borden Chemicals, and 2) two ammonia plants and a urea plant owned by Triad Nitrogen. Triad Nitrogen acquired the melamine plant in 2003, and the two adjacent facilities came under common control. Terra purchased the Donaldsonville facility on December 21, 2004.[1]

Shortly after purchasing the Donaldsonville Plant, Terra shut down the melamine unit, the urea unit, and one of the two anhydrous ammonia units. The melamine facility had been operating under AI 2398, Permit No. 0180-00005-V0, issued November 28, 2001, and administratively amended May 22, 2003.[2] The ammonia and urea units were operating under AI 2245, Permit No. 0180-00009-V0, issued January 11, 2001.[3]

From the shutdown of the ammonia unit (Ammonia Plant No. A-1), Terra is proposing to transfer NO_x emission credits generated by Ammonia No.1 Primary Reformer (Emission Point No. ID-06). From the shutdown of the urea unit, Terra is proposing to transfer NO_x emission credits generated by Urea Boiler No. 1 (Emission Point No. ID-30) and Urea Boiler No. 2 (Emission Point No. ID-32). An analysis of the validity of NO_x emission credits generated by the reformer has already been issued and was public noticed on April 7, 2005.[4] At that time, 262.34 tons of NO_x emission credits were transferred, leaving a balance of 939.22 tons (901.5 non-O_3 season + 37.72 O_3 season) for the No. 1 Primary Reformer (EPN ID-06).[5] The department examined this analysis to determine if an update was warranted and confirmed its validity. Therefore, this analysis pertains to the Urea Plant boilers, ID-30 and ID-32, only.

Urea Boilers Nos. 1 and 2 were natural gas-fired steam boilers each with a maximum rating of 149 MM BTU/hr. The boilers were constructed prior to 1984 and were not subject to any federal or state regulations for emissions of NO_x at the time of their shutdown on December 24, 2004.

Summary

A portion of the resultant NO_x emission decrease is surplus, permanent, quantifiable, and enforceable in accordance with LAC 33:III.Chapter 6-Regulations on Control of Emissions Through the Use of Emission Reduction Credits Banking. Accordingly, these reductions qualify as Emissions Reduction Credits (ERC). Amounts in the following table are given in tons per year (TPY).

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[1] See EDMS Document No. 32721306.
[2] See EDMS Document Nos. 21679020 and 26935829.
[3] See EDMS Document No. 18878219.
[4] See EDMS Document Nos. 32772439 and 32772441.
[5] See EDMS Document No. 32909458.

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Total NO_X ERC:

	Urea Boiler No.1	Urea Boiler No. 2
Allowable Emissions Before Reduction:[6]	173.4	150.8
Actual Emissions: (O_3 season + non-O_3 season) [7]	(53.45 +74.05) = 127.5	(50.93 + 70.57) = 121.5
Adjusted allowable emissions (§607.C.3): (O_3 season + non-O_3 season) season	(27.36 + 100.71) = 128.07	(27.36 + 87.59) = 114.95
Baseline emissions (§607.C.4): (O_3 season + non-O_3 season)[8]	(27.36 + 74.05) = 101.41	(27.36 +70.57) = 97.93
Allowable emissions after reduction (§607.C.5):	0.00	0.00
Surplus emission reduction (§607.C.6):	101.41	97.93
Adjustments for netting (§607.D):	-0	-0
Total ERC:	**101.41**	**97.93**

Louisiana promulgated a NO_X Reasonably Available Control Technology (RACT) rule (LAC 33:III.Chapter 22) on March 20, 2002. Beginning May 1, 2005, Chapter 22 required sources to reduce NO_X emissions during the five month ozone season, May 1 through September 30, inclusively. Typically, a stationary source reduces emissions below the baseline to generate surplus emission reduction credits. Due to the five month applicability of Chapter 22, the allowable emission limitation for a stationary source could potentially have two values, one for the five month ozone season, and another for the seven-month non-ozone season.

Thus, baseline emissions for a given stationary source, which are used to determine the surplus emission reduction (§607.C.6), could have two different values. In order to accurately determine the amount of ERC that can be used as offsets for nonattainment new source review (NNSR) permitting, baseline emissions and surplus ERC must be determined for the two time periods. Total NO_X ERC for any annual time period will consist of the ERC from the five month ozone season and the ERC from the seven month non-ozone season. Offset requirements for new sources derive from Section 173(a)(1)(A) of the Clean Air Act (CAA), which concerns "total" emissions and does not address the use of emission offsets for nonattainment permitting over periods of less than one year. Therefore, the NO_X ERC to be used in all NNSR permitting under LAC 33:III.504 must be determined by adding the ERC from the ozone season and the non-ozone season.

With respect to all offsets under Chapter 5 and all ERC under Chapter 6, the total NO_X emission increases during the ozone season must be offset by NO_X ERC from the ozone season. Non-ozone season NO_X

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[6] Permit No. 0180-00009-V0 issued 1/11/ 01.

[7] Average of 2001 and 2002 actual emissions (§607.C.2).

[8] Baseline emissions shall be the lower of actual emissions or adjusted allowable emissions when the design value for the nonattainment area is not above the NAAQS for ozone (§607.C.4.a.ii); for NOx, baseline emissions have two values, one for ozone season and one for non-ozone season.

increases may be met by either ozone or non-ozone NO_X ERC. The annual NO_X increase must be offset by the total combination of ozone and non-ozone season surplus NO_X emission reduction credits. See 67 FR 48093-48094 (July 23, 2002).

Ozone (O_3) season NO_x ERC:

	Urea Boiler No.1	Urea Boiler No. 2
Allowable Emissions Before Reduction:	72.69[9]	63.21[10]
Actual Emissions:	53.45	50.93
Adjusted allowable emissions (§607.C.3):	27.36	27.36
Baseline emissions (§607.C.4):	27.36	27.36
Allowable emissions after reduction (§607.C.5):	0.00	0.00
Surplus emission reduction (§607.C.6):	27.36	27.36
Adjustments for netting (§607.D):	-0	-0
O_3 season ERC:	**27.36**	**27.36**

Non-ozone (non-O_3) season NO_x ERC:

	Urea Boiler No.1	Urea Boiler No. 2
Allowable Emissions Before Reduction:	100.71[11]	87.59[12]
Actual Emissions:	74.05	70.57
Adjusted allowable emissions (§607.C.3):	100.71	87.59
Baseline emissions (§607.C.4):	74.05	70.57
Allowable emissions after reduction (§607.C.5):	0.00	0.00
Surplus emission reduction (§607.C.6):	74.05	70.57
Adjustments for netting (§607.D):	-0	-0
Non-O_3 season ERC:	**74.05**	**70.57**

Analysis of validity

Timeliness

Per §615.A, all applications for banking emission reductions shall be submitted by March 31 following the year in which the reductions occurred. The Urea Plant Boiler No.1 and Boiler No. 2 were shut down on

[9] 173.4 * 153/365
[10] 150.8 * 153/365
[11] 173.4 * 212/365
[12] 150.8 * 212/365

December 24, 2004. The application was dated March 24, 2005.[13]

Emissions reductions can be recognized as ERC only if they are determined to be surplus, permanent, quantifiable, and enforceable. Each criterion is addressed below.

Surplus

Procedures for calculating the surplus emission reduction are outlined in §607.C & D.

1. The design value for the nonattainment area is below the 1-hour national ambient air quality standard (NAAQS) for ozone. Per §607.C.4.ii, if the design value for the nonattainment area is not above the 1-hour national ambient air quality standard (NAAQS) for ozone, the department shall compare the actual emissions with the adjusted allowable emissions in order to determine baseline emissions.

2. Calculate actual emissions during the baseline period. Actual emissions during the baseline period of 2001 and 2002 claimed in the Terra Urea Plant ERC Bank application were checked against the department's Emission Inventory database. NO_x emissions during the baseline period were calculated to be 127.5 TPY for Boiler No. 1 (53.45 tons-O_3 season + 74.05 tons-non O_3 season) and 121.5 TPY for Boiler No. 2 (50.93 tons-O_3 season + 70.57 tons-non O_3 season).

3. Calculate adjusted allowable emissions. Allowable emissions shall be adjusted to account for all new or revised federal or state regulations adopted that will require, or would have required, all or a portion of the emission reductions that comprise the ERC application. At the time of shutdown of Urea Boilers 1 and 2, the plant was operating under Permit No. 0180-00009-V0 issued January11, 2001. This permit was also in effect during the baseline period of 2001-2002. The permit had no requirements for emissions of NO_x that were applicable to the urea steam boilers. In addition, the boilers, which were constructed prior to 1984 and had not since been modified or reconstructed, were not subject to any federal New Source Performance Standard (NSPS). The department examined the federal regulations and found no new or modified requirements that would now be applicable to Boilers 1 and 2.

   With regard to state regulations, there were no NO_x regulations applicable to natural gas-fired boilers at the time of the reduction. However, LAC 33:III.Chapter 22 was promulgated on March 20, 2002, and had an effective date of May 1, 2005. §2201.D.1 sets NO_X emissions limits for stationary gas turbines and industrial boilers. Boilers 1 and 2 were shut down in 2004, and Terra would have had to install low NO_x burners or other controls to meet the new NO_x RACT regulations by the May 1, 2005 compliance date. Therefore, allowable NO_x emissions during the 5-month ozone season have to be adjusted for compliance with the LAC 33:III.Chapter 22 standard of 0.10 pounds NO_x/MM Btu for industrial boilers with a rated heat input ≥ 80 MM Btu/hr. The heat input of 149 MM Btu/hr for each boiler during the 2001 and 2002 ozone seasons was multiplied by the factor of 0.10 lb/MM Btu to calculate what would have been allowed during the ozone season beyond May 1, 2005. Adjusted allowable ozone season NO_x emissions for each boiler equal 27.36 t ons. F or non-ozone season, since there are no new or revised NO_x regulations adopted since the baseline period that affect Boilers 1 and 2, adjusted allowable emissions for this period equal permitted values. Total adjusted allowable NOx emissions for the baseline period are calculated to be 128.07 TPY for Boiler No. 1 (27.36 tons-O_3 season + 100.71 tons-non O_3 season) and

[13] See EDMS Document No. 32756610.

114.95 TPY for Boiler No. 2 (27.36 tons-O_3 season + 87.59 tons-non O_3 season).

4. Quantify baseline emissions. Per §607.C.4.a.ii, if the design value is not above the NAAQS for ozone, baseline emissions shall be the lower of actual emissions (step 2 above) or adjusted allowable emissions determined in accordance with §607.C.3 (step 3 above). In this case, adjusted allowable emissions are the limiting factors for ozone season and actual emissions are the limiting factors for non-ozone season for each boiler. Baseline emissions for Boiler No. 1 total 101.41 TPY (27.36 tons-O_3 season + 74.05 tons-non O_3 season). Baseline emissions for Boiler No. 2 total 97.93 TPY (27.36 tons-O_3 season + 70.57 tons-non O_3 season).

5. Calculate allowable emissions after the reductions occurred. The Urea Plant, including the steam boilers, was permanently shut down; thus, allowable emissions are zero.

6. Calculate the surplus emission reduction by subtracting the allowable emissions after the reduction occurred from the baseline emissions.

   Boiler No. 1: 101.41 TPY - 0.00 TPY = 101.41 TPY (27.36 O_3 season + 74.05 non-O_3 season)
   Boiler No. 2: 97.93 TPY - 0.00 TPY = 97.93 TPY (27.36 O_3 season + 70.57 non-O_3 season)

7. Finally, adjust for netting (§607.D). Emission reductions used in a netting analysis (i.e., to determine the *net emissions increase* as defined in LAC 33:III.504 or 509, as appropriate) that prevented the increase from being considered "significant" are not eligible for use as offsets. The quantity of emission reductions utilized to "net out" shall not be considered creditable. There is zero adjustment for netting, as the emission reductions were not used in a netting analysis.

   Boiler No. 1: 101.41 TPY - 0.00 TPY = 101.41 TPY (27.36 O_3 season + 74.05 non-O_3 season)
   Boiler No. 2: 97.93 TPY - 0.00 TPY = 97.93 TPY (27.36 O_3 season + 70.57 non-O_3 season)

Permanent

The reductions are permanent because the sources Urea Boiler No. 1 and Urea Boiler No. 2 were shut down in December 2004, and then deleted as emission sources from the Donaldsonville Plant Title V Permit No. 0180-00009-V1 issued June 6, 2009.

Quantifiable

The emissions from the plant were calculated using approved EPA methods, EPA emission factors, factors developed through stack tests performed in accordance with approved EPA methods, process data, and production data.

Enforceable

Finally, the reductions are enforceable via Permit No. 0180-00009-V1 issued June 6, 2009, in which the emission sources Urea Boiler No. 1 (Emission Point No. ID-30) and Urea Boiler No. 2 (Emission Point No. ID-32) were deleted from the Donaldsonville facility permit. Further operation of these sources would constitute operation without a permit in violation of Louisiana environmental regulations and the Louisiana Environmental Quality Act.